## 481 How long can TIVADS be left unflushed?

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**Introduction:** Although manufacturers recommend that unused totally implanted central venous access devices (TIVADS) are flushed with heparin solution monthly, this is not evidence based and frequent access increases the risk of infection, can prematurely wear the membrane, and has resource complications. We have shown that heparin remains active in the device at 2 months and routine flushing can be safely extended to this interval. However, the longest time that TIVADS can be left unflushed is unclear. To address this, we looked at the complication rate in CF patients with TIVADS attending our adult unit who had defaulted from their regular flush (<60 days).
**Method:** We reviewed 69 patient records of over 3 years (2005–2007), looking for complications in those with extended flush intervals.
**Results:** Fifty five (80%) received flushes as recommended. The remaining 14 (20%) defaulted on 24 occasions (mean 128 days, range 77 to 298; 5 [36%] >1 occasion [range 2–5]). In these, 10 TIVADS still function without complication, despite 1 not being flushed for 10 months. In the remaining 4, 1 developed infection, 1 had port migration, and 2 had clot formation (SVC obstruction and TIVAD occlusion respectively). In the patient with SVC obstruction this was not temporally related to the extended flush interval. In the patient with occlusion, following TIVAD removal and insertion of a new device, the subsequent TIVAD also became occluded despite vigilant routine flushing.
**Conclusion:** Our audit identified 24 episodes in 14 patients who had lengthened flush intervals, in some cases extremely prolonged. Although 4 suffered complications, in only 1 was this possibly related to the lack of routine flushing. Further studies are indicated to investigate the optimum time interval for routine flushing of TIVADS.

## 482 Central vein obstruction due to TIVADs: treatment in one CF centre

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**Introduction:** Port occlusion and infection are well recognized complications of totally implanted venous access devices (TIVADs), but associated thrombosis of the great vessels is uncommon and there is no accepted treatment protocol: we could find only 5 examples in the CF literature. We therefore reviewed such cases in patients attending our large regional CF centre.
**Methods:** We looked at demographics, presentation, management, outcome, any complications and follow-up in all 5 patients (4 female) 1995 to 2007 with TIVADs (all PortaCaths®) who had suffered a central venous thrombosis.
**Results:** Average age at thrombosis was 21 years (range 14–22), at a mean time after implantation of 37 months (1–72). One catheter had migrated. 3 patients presented with a swollen face and neck, 1 with arm pain and 1 with neck pain. Three were investigated by MRI, 1 by venogram and 1 by venacavagram. All underwent thrombolysis: 3 with streptokinase, 1 with alteplase and 1 with r-tpa. Three different streptokinase regimes were used (1.5mu over 12 hours, 250,000 units over 30 min followed by 100,000 u/hr for 5 days, and 250,000u over 30 min followed by 100,000u/hr for 12 hours), all followed by heparin. One developed haemoptysis (but no anaemia) and thrombolysis was stopped, and a further patient developed bleeding from a venepuncture site and bruised arms. All 5 were commenced on warfarin, but 2 had persistent symptoms. At follow up, in 4 patients the TIVAD remained patent, but the 1 where the catheter had migrated was removed.
**Conclusion:** Each patient was managed differently, reflecting the lack of published data. Collection of cases of this rare complication from different CF centres may allow the development of guidelines to determine the best way of preserving central veins in these patients.

## 483 Effects of pregnancy on the health of women with CF

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**Introduction:** Health status is associated with maternal outcome following pregnancy. Pre-conception advice is based on lung function and nutritional status.
**Aim:** To review the health status of women with CF pre and post pregnancy 2000–2007.
**Methods:** Records of women referred from this Centre to Chelsea and Westminster Hospital for obstetric care were reviewed. Lung function and weight were recorded one year pre-conception and approximately one year post delivery.
**Results:** Twenty-seven women (29 babies) were referred, data were collected on 26. Mean age of mothers at delivery: 31 yrs (range 22–40 yrs). Genotype: homozygous DF508 ×7, DF508/another mutation ×6, DF508/unknown mutation ×8, one known and one unknown mutation ×2, no known mutations ×4. Sputum: *Pseudomonas aeruginosa* +/– *Staphylococcus aureus* ×23. CF-related diabetes ×3, gestational diabetes ×6. Pre-pregnancy mean FEV1: 2.01 L (64% predicted, range 0.65–3.35 L), mean FVC: 3.1 L (86.17% predicted, range 1.37–4.26 L), mean Sa02: 97.65% (93–100%). Lung function one year post delivery – mean FEV1: 1.85 L (60% predicted, range 0.65–3.27 L), mean FVC: 2.88 L (81% predicted, range 1.37–4.3 L), mean Sa02: 97.28% (range 91–100%). Percent predicted change in FEV1: $p < 0.05$, percent predicted change in FVC: NS. Mean pre-pregnancy weight: 65 kg (range 53–98 kg), post-pregnancy: 59.6 kg (range 49–76.6 kg). Change in weight: $p = 0.03$.
**Discussion:** Although these are small numbers, as with previous reports we have found that declining health status is an indicator of outcome following pregnancy (FEV1 and weight). With improving health and survival many young women with CF expect to have children. It is essential that CF Teams use pre-conception discussions to emphasise the importance of maximising health status before conceiving, even in moderate disease.

## 484 The increasing range and complexity of surgery in patients with cystic fibrosis

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As patients with CF are living longer new issues arise, with increased co-morbidity from both CF-related complications and conditions unrelated to CF. Surgery and anaesthesia pose particular problems for these patients. We reviewed the surgical procedures which our adult CF patients had required.
The records of 257 patients (146 male; age range 15–60 years) were reviewed. Overall, 128 (50%) of these patients had undergone 250 full surgical procedures under anaesthesia (not including gastrostomy or portacath insertion). Of all procedures 65% were for conditions related to CF. There were 68 abdominal operations including 20 laparotomies for meconium ileus, 10 for later bowel obstruction, 8 cholecystectomy, 2 fundoplication and 2 fibrosing colonopathy operations. Fifty ENT procedures were performed. Other procedures included 8 renal calculus surgery, 4 lobectomies, 2 pneumothorax surgery, and 1 pulmonary embolectomy. Twenty-five patients underwent lung transplant surgery. Surgery for conditions not directly related to CF totalled 87 procedures. Gastrointestinal surgery included 5 appendicectomies, 5 hernia repairs and 1 colectomy for pseudomembranous colitis. Nine gynaecological surgical procedures were performed and 6 patients had a caesarean section. Other surgery included 10 orthopaedic, 2 vascular and 2 neurosurgical procedures. Eight patients required surgery for malignancy: 3 cervical carcinoma, 2 skin cancer, 1 meningioma, 1 breast and 1 oesophageal carcinoma.
Patients with CF are undergoing an increasing range and complexity of surgical procedures. A CF Centre needs to have close links with associated specialist departments, and surgeons and anaesthetists need to be aware of the perioperative management of CF.